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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/722,644	11/26/2003	Laurent Stefani	144724	7327

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EXAMINER

CHENG, JACQUELINE

ART UNIT	PAPER NUMBER
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3768

DATE MAILED: 09/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	10/722,644		STEFANI ET AL.	
	Examiner		Art Unit	
	Jacqueline Cheng		3768	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 February 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>8/4/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-16 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

On October 26, 2005, the USPTO published Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility. See:

http://www.uspto.gov/web/offices/pac/dapp/opla/preognotice/guidelines101_20051026.pdf

This guideline details a procedure for determining patent eligible subject matter. As to claims 1-16, the first step in this process is whether the claims fall within one of enumerated categories. In the immediate application, claims 1-11 and claims 12-16 are drawn to a process - a “method for generating view of a heart” and “a computer readable medium encoded with a program” - and meets this step. However, the analysis does not end here. The next step is whether a judicial exception (abstract ideas, laws of nature, natural phenomenon) is provided in the claim. In the immediate application, claims 1-16 clearly includes one of the judicial exceptions in that “calculating” one of a short axis and a long axis is nothing more than an abstract idea. While abstract ideas alone are not eligible, the claim as a whole must be analyzed to determine whether it is for a particular application of the abstract idea. For claims including

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such excluded subject matter to be eligible, the claim must be for a practical application of the abstract idea, law of nature, or natural phenomena.

To satisfy the requirement of a practical application, the claimed invention must:

- (1) Transform an article or physical object to a different state or thing; if no transformation, then
- (2) the claimed invention must produce an (a)useful, (b)concrete, and (c) tangible result.

Regarding (1) above, the claims do not provide a transformation or reduction of an article to a different state or thing. “Calculating” at least one of a short axis and a long axis does not transform an article or physical object to a different state or thing. Accordingly, one must then consider whether the claimed invention produces a useful, concrete, **and** tangible result.

(a) Useful Result - For an invention to be “useful” it must satisfy the utility requirement of section 101. The USPTO’s official interpretation of the utility requirement provides that the utility of the invention has to be (i) specific, (ii) substantial and (iii) credible. See MPEP 2107.

(b) Tangible Result

The tangible requirement does not necessarily mean that a claim must either be tied to a particular machine or apparatus or must operate to change articles or materials to a different state or thing. However, the tangible requirement does require that the claim must recite more than a 101 judicial exception, in that the process claim must set forth a practical application of that 101 judicial exception to produce a real world result.

Regarding the tangible result requirement, the claim clearly does not provide a tangible result, for example, once the long axis is calculated, how is this then applied?

(c) Concrete Result

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Another consideration is whether the invention produces a “concrete” result. Usually, this question arises when a result cannot be assured. In other words, the process must have a result that can be substantially repeatable or the process must substantially produce the same result again. Resolving this question is dependent on the level of skill in the art. For example, if the claimed invention is for a process which requires a particular skill, to determine whether the process is substantially repeatable will necessarily require a determination of the level of skill of the ordinary skilled artisan.

In view of the above analysis, applicant’s claims 1-16 are processes which includes a judicial exception therein. Upon review of the claim as a whole, there is no transformation nor does the claim produce a tangible result. Accordingly, the claim is non-statutory under 35 U.S.C. 101.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claims 1, 2, 12, 13** are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent No. 5,421,331 (herein referred to as Devito et al.). Devito et al. discloses automatically identifying the long axis of the left ventricle to improve the diagnostic utility of a myocardial perfusion study from a 3D dataset (col. 1 line 44-47) with a program that runs on a computer. The computer does this by first identifying the entire heart from the 3D image data and segments

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out the left ventricle by reconstructing a set of transverse slices of it. A representative slice of the left ventricle is then selected and a first estimate of the long axis is determined. The computer then identifies and constructs line segments from the local maxima and local minima. The resulting line, element 44 of fig. 6, shows the first estimate. The second estimate is then taken by using the calculated maxima and minima to determine points in which to fit a line through their centers for the second estimate of the long axis (col. 4 line 48-col. 5 line 40).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claim 3** is rejected under 35 U.S.C. 103(a) as being unpatentable over Devito et al. as applied to claim 1 above, and further in view of US Publication No. 2003/0153823 A1 (herein referred to as Geiser et al.). Geiser et al. discloses that the long axis of a heart can include the aorta and the atrium as well as the ventricle (paragraph 0027). It would be obvious to one with ordinary skill in the art at the time of the invention to combine Geiser et al. with Devito et al. as imaging the aorta and atrium as well as the ventricle will give an expanded view of the heart.

5. Claims 4-8 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Devito et al. as applied to claims 1 and 12 above, and further in view of US Patent No. 6,217,520

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B1 (herein referred to as He et al.). It would be obvious to one with ordinary skill in the art at the time of the invention to combine He et al. with Devito et al. as both inventions are to the same art of automatic extraction of an object of interest from the heart, and He et al. would make Devito et al. more useful by producing an accurate border of the heart.

6. **Claims 4 and 14:** He et al. discloses that the images can be taken at the end of diastole period, which would be close to 75% of an R to R interval (col. 7 line 54-57).

7. **Claim 5, 6, and 15:** He et al. discloses that it is well known in the art to use an axis of inertia to estimate the long axis. This is done through calculating the axis of least second momenta which is the axis of least inertia (col. 6 line 40-67). So although Devito et al. discloses determining the first estimate by using local maxima and local minima, it would be obvious to use any type of estimate of the long axis such as an estimate using the axis of inertia. As for selecting a right extremity point as the first point for the second estimate, the right most point depends on the orientation of the heart and the image. If the image of the slice is viewed as the heart is orientated, with the open u part (where the aorta and atrium connect above the ventricle) at the top, the midway point of the line connecting the ends of the maxima (element 52 of fig. 8) is the right extremity point.

8. **Claims 7, 8, and 16:** Devito et al. discloses that after the centerline is determined, it is known that the long axis lies in a plane that includes this centerline. This plane is perpendicular to the transverse slice and so the image is resliced along the determined plane, resulting in sagittal slices. The selected sagittal slice used would have the center of inertia for that point must lie along the long axis. The centerline of the new slice is then estimated and this new long axis

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estimate is combined with the transverse long axis estimate to determine the long axis location (col. 5 line 58-col. 6 line 27).

9. **Claims 9-11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Devito et al. as applied to claim 1 above, and further in view of US Patent No. 5,699,799 (herein referred to as Xu et al.). Xu et al. discloses that CT, PET, MRI, and SPECT (col. 1 line 12-18) are all well known imaging techniques for imaging parts of the body such as the heart (col. 2 line 64). It would be obvious to one with ordinary skill in the art at the time of the invention to combine Xu et al. with Devito et al. in order to expand the utility of Devito for use with various imaging devices.

10. **Claims 17 and 18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Devito et al. in view of US Publication No. 2002/0156359 A1 (herein referred to as Knoplioch et al.) Devito et al. discloses most of what is claimed in claims 17 and 18 as disclosed above in paragraph 2. What Devito et al. does not disclose is the detector array, radiation source and computer and workstation to process the data. Knoplioch et al. discloses these items in reference to 3D cardiac imaging (paragraph 0010). It would be obvious to one with ordinary skill in the art at the time of the invention to combine Knoplioch et al. with Devito et al. as Knoplioch et al. discloses obtaining views of a heart along useful planes. When doing imaging of hearts it is often useful to know where the long axis is in order to have a reference point. So therefor it would be

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obvious to automatically determine the long axis of the heart of the images taken with Knoplioch et al.

11. **Claims 19 and 20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Devito et al. in view of Knoplioch et al. as applied to claim 17 above, and further in view of He et al. as disclosed above in claims 6 and 7. It would be obvious to one with ordinary skill in the art at the time of the invention to combine He et al. with Devito et al. and Knoplioch as Devito et al. and He et al. are to the same art of automatic extraction of an object of interest from the heart, and require determining a long axis of the heart.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacqueline Cheng whose telephone number is 571-272-5596.

The examiner can normally be reached on M-F 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eleni Mantis-Mercader can be reached on 571-272-4740. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JC

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TC 3768